

Thermopile Detector Radiation Hardened Readout, Phase II

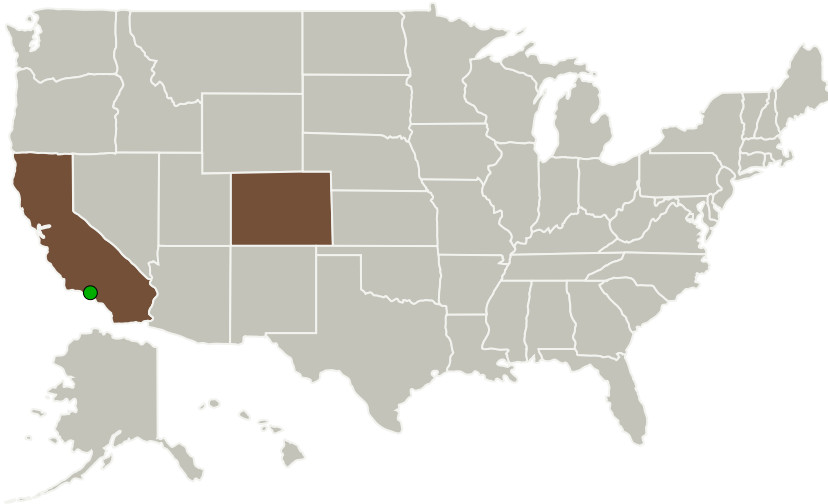
Completed Technology Project (2011 - 2014)



Project Introduction

The NASA Jupiter Europa Orbiter (JEO) conceptual payload contains a thermal instrument with six different spectral bands ranging from 8 μ m to 100 μ m. The thermal instrument is based on multiple linear arrays of thermopile detectors that are intrinsically radiation hard; however, the thermopile CMOS readout needs to be hardened to tolerate the radiation sources of the JEO mission. Black Forest Engineering (BFE) is developing a thermopile readout to tolerate the JEO mission radiation sources. On Phase II, BFE will test new circuitry for radiation hardness, complete the design of a 1x128 thermopile readout integrated circuit (ROIC) and fabricate the ROIC using 180 nm CMOS technology. The Phase II ROIC also includes on-chip 16-bit analog-to-digital conversion and serial digital output for system noise immunity. The Phase II ROIC will be characterized to meet the JEO thermal instrument requirement.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Black Forest Engineering, LLC	Lead Organization	Industry	Colorado Springs, Colorado
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California



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Primary U.S. Work Locations

California

Colorado

Project Transitions



June 2011: Project Start



May 2014: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140009>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Black Forest Engineering, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Stephen Gaalema

Co-Investigator:

Stephen Gaalema

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Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System